

WE CLAIM:

1. A sensor for detecting acoustical signals in the bore of a well, comprising:
an optical fiber having a core and a cladding; and
at least one periodic refractive index perturbation formed within the optical
5 fiber.
2. A remotely deployable acoustic sensing array for detecting acoustic signals
in a well bore comprising:
an optical fiber having a core and a cladding layer; and
a plurality of periodic refractive index perturbations formed at selected
10 intervals along a selected length of the optical fiber.
3. The device of claim 2, wherein the periodic refractive index perturbations is
a Bragg grating.
4. A system for detecting acoustic signals in the producing area of a well bore,
comprising:
15 an optical fiber having a core and a cladding layer;
at least one periodic refractive index perturbation formed in the optical fiber
at a location of the fiber to be deployed in the producing area of a well;
an optical interrogator in optical communication with the optical fiber, the
optical interrogator for transmitting light down the optical fiber and for receiving light
20 reflected by the at least one periodic refractive index perturbation formed within the fiber.
5. The system of claim 4, further comprising a processor programmed to
analyze the reflected light to provide a signal representative of the presence of a detected
acoustic signal.
6. The system of claim 4, wherein the at least one periodic refractive index
25 perturbation and a selected length of optical fiber form an acoustic sensor.
7. The system of claim 6, wherein the acoustic sensor is configured to be
mounted on an external side of a well casing.